Concurrence: for O. A. Farabee 10/14/99

O. A. Farabee, Director,
FFTF Standby Project Office,
U.S. Department of Energy,
Richland Operations Office

## 4.5 ART PROJECT

The ART Project mission is to manage and deactivate the FFTF and FMEF, the Nuclear Energy Legacy alkali metal test facilities, and the Plutonium Recycle Test Reactor (PRTR)/309 Building. The FFTF is being maintained in a standby condition, pending a DOE decision on the potential for a future mission, and only limited deactivation is being performed.

The ART Project scope includes all activities needed to (1) maintain the facilities within their approved safety envelope, (2) disposition radioactive and nonradioactive Na from the designated facilities, (3) remove nuclear materials from the FFTF, (4) remove spent nuclear fuel from the FFTF, (5) remove or stabilize and characterize hazardous and radioactive materials in the designated facilities, (6) make useable facilities available for alternative uses, and (7) establish non-useable facilities in a condition requiring minimal S&M during the interim period until final D&D is accomplished. In accomplishing this scope, the ART Project will perform the following activities.

- Protect the health and safety of the public, workers, and the environment.
- Maintain compliance with ES&H codes and standards during deactivation and establish a safe and environmentally secure configuration that is easily maintained until final D&D.
- Maintain safe, secure, and compliant storage of SNM/NM/NF.
- Conduct work in accordance with the Tri-Party Agreement; local, national, international, and other agreements; and in compliance with applicable federal, state, and local laws.
- Develop detailed facility deactivation plans, end point criteria, and regulatory documentation.
- Implement cost-effective, innovative approaches to ensure the required safety envelope is defined and maintained during deactivation.
- Complete deactivation and turnover of subprojects within approved baseline schedules.
- Apply lessons learned from other deactivation projects.
- Seek beneficial uses for facilities, equipment, and materials (all types) and resources.

The Advanced Reactors Transition (ART) has two missions. One, funded by DOE-EM is to transition assigned, surplus facilities to a safe and compliant, low-cost, stable, deactivated condition (requiring minimal surveillance and maintenance) pending eventual reuse or D&D. Facilities to be transitioned include the 309 Building / Plutonium Recycle Test Reactor (PRTR) and Nuclear Energy (NE) Legacy Facilities.

The second mission, funded by DOE-NE, is to maintain the Fast Flux Test Facility (FFTF) and affiliated 400 Area buildings in a safe and compliant standby condition, maintain the condition of the plant hardware, software and personnel in a manner not to preclude a plant restart, and to support the EIS contractor as requested by providing technical information and analyses.

### 4.5.a Project Structure

- Advanced Reactors Transition (RL-TP11)
- FFTF Project (RL-MS01)

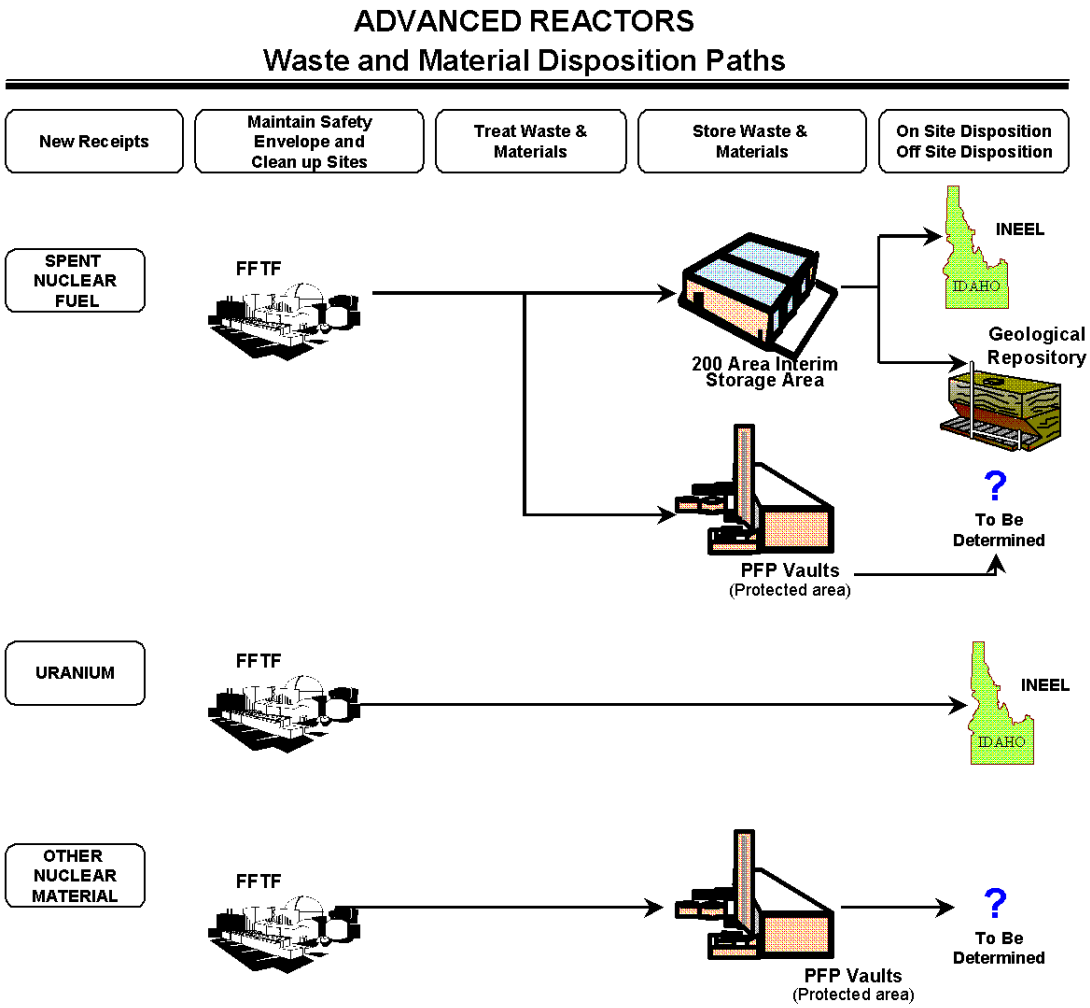
### 4.5.b Hanford Strategic Plan Goals

The Waste, Material, and Geographic Area Goals contained in the Hanford Strategic Plan (DOE/RL-96-92), represent planning assumptions around which the Hanford Environmental Management effort is structured. Each Mission Area and Project partially support each of these goals, per scope of work described in the Prime Contracts. As an aggregate, all Mission Areas and Projects will fulfill the requirements of the Hanford Strategic Plan. As such, the Goals identified in this section cover only the goals directly supported by that specific Mission Area. Further details are contained in the Project planning documents. As records-of-decision are issued, these Goals will be amended in future revisions of the Hanford Strategic Plan.

- The 300 Area waste sites, materials and facilities will be remediated to allow industrial and economic diversification opportunities. The Federal government will retain ownership of land in and adjacent to the 300 and 400 Areas, but will lease land for private and public uses to support regional industrial and economic development. Excess land within the 1100 Area will be targeted for transition to non-Federal ownership.
- Safe, stable, secure onsite storage will be provided for all nuclear materials pending decisions on final disposition or until beneficial offsite uses are identified. Facilities without identified future uses will be transitioned to low-cost, stable deactivated conditions (requiring minimal surveillance and maintenance) pending eventual D&D and removal or closure.

### 4.5.c Technical Logic

## Figure 4-10 Advanced Reactors Transition Material/Flow Logic




Note:
1.) Quantities are based on FY97 and FY98 actuals, plus the planned lifecycle quantities beyond FY99, based upon the FY2000 Multi-Year Work Plan.
2.) All quantities are rounded to the third significant digit.
3.) Stream ID's are for internal (SE) tracking purposes only.

Advanced Reactors 11-09-99.ppt 990380
Systems Engineering - Sandy Bradford

## 4.5.d Facility Life-Cycle Responsibility Assignments

### Table 4-79 Advanced Reactors Transition Project Facility Life-Cycle Responsibility Assignments

| Asset | Life Cycle Phase | | | | | | |
|---|---|---|---|---|---|---|---|
| | Program Planning | Pre-Conceptual | Conceptual | Execute | O&M | Close Out | |
| | | | | | | Post Ops | D&D |
| **FFTF** | RL-MS01 | | | | RL-MS01 | RL-ER05<br>RL-MS01 | RL-ER06<br>RL-ER07 |
| 403 | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 405 | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 408A | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 408B | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 408C | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 409A | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 409B | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 432A | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 440 | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 453A | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 453B | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 453C | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4621E | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4621W | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4703 | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4717 | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4717A | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4718 | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4721 | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4734A | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 483 | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 484 | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 491E | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 491S | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 491W | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 402 | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 427 | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 427A | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 436 | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 437 | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 451A | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4701A | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4701C | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4710 | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4713A | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4713B | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4713C | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4713D | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4716 | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4726 | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4727 | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4732A | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4732B | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4732C | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4791TC | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 480A | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 480B | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 480D | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 481 | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 481A | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 482A | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 482B | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 482C | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 483A | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 483B | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4802 | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4814 | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |

## Table 4-79 Advanced Reactors Transition Project Facility Life-Cycle Responsibility Assignments (Continued)

| Asset | Life Cycle Phase | | | | | | |
|---|---|---|---|---|---|---|---|
| | Program Planning | Pre-Conceptual | Conceptual | Execute | O&M | Close Out | |
| | | | | | | Post Ops | D&D |
| 4831 | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4842A | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4842B | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4862 | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4734C | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4718TC | RL-MS01 | | | | RL-MS01 | RL-MS01 | RL-ER06 |
| 4622 | RL-MS01 | | | | | RL-MS01 | RL-ER06 |
| **309 Facility** | RL-TP11 | | | | | RL-ER05<br>RL-TP11 | RL-ER06 |
| **NE Legacy Facilities** | RL-TP11 | | | | | RL-TP11 | RL-ER05 |
| 335 Sodium Test Facility | RL-TP11 | | | | | RL-TP11<br>RL-TP14 | RL-ER05 |
| 337B | RL-TP11 | | | | | RL-TP11<br>RL-TP14 | RL-ER05 |
| 3718M | RL-TP11 | | | | | RL-TP11<br>RL-TP14 | RL-ER05 |

* RL PBS Identifier Index:

RL-ER05 - Surveillance & Maintenance
RL-ER06 - Decontamination & Decommissioning
RL-ER07 - Long Term Surveillance & Maintenance
RL-MS01 - FFTF Project
RL-TP11 - Advanced Reactors Transition
RL-TP14 - Hanford Surplus Facility Prog 300A Revitalization

## TABLE 4-80 Advanced Reactors Transition Project Facility Life-Cycle Responsibility Assignments for Waste Sites

| Waste Site | Status | Life Cycle Phase | | |
|---|---|---|---|---|
| | | S&M | Post Ops | Remedial Action |
| **CP Soil Site Operable Units** | Active | | RL-ER02<br>RL-ER05 | RL-ER02<br>RL-ER07 |
| 221-T CSTF, 221-T Containment System Test Facility, T Plant Laboratory, 221-T Head End | Closed Out | | RL-TP11 | RL-ER02 |
| **S600 Soil Site Operable Units** | Active | | RL-ER03<br>RL-ER05 | RL-ER03<br>RL-ER07 |
| 300-72, 308 Building Stormwater Runoff, Miscellaneous Stream #404 | Rejected | | RL-TP11 | |
| 300-73, 308 Building Stormwater Runoff, Miscellaneous Stream #405 | Rejected | | RL-TP11 | |
| 300-74, 308 Building Stormwater Runoff, Miscellaneous Stream #406 | Rejected | | RL-TP11 | |
| 300-77, 309 Building Stormwater Runoff, Miscellaneous Stream #450 | Rejected | | RL-TP11 | |
| 300-87, 309 Building Stormwater Runoff, Miscellaneous Stream #679 | Rejected | | RL-TP11 | |
| 400 FD10, 400 Area French Drain 10, 482A Building - T-58 Stormwater, Miscellaneous Stream #25, Injection Well #10 | Rejected | RL-MS01 | | RL-ER03 |
| 400 FD10A, 400 Area French Drain 10A, 482A Building -T-87 Stormwater, Miscellaneous Stream #24, Injection Well #10A | Rejected | RL-MS01 | | RL-ER03 |
| 400 FD1A, 400 Area French Drain 1A, 4717 Reactor Service Building HVAC Condensate, Miscellaneous Stream #14, Injection Well #1A | Rejected | RL-MS01 | | RL-ER03 |
| 400 FD1B, 400 Area French Drain 1B, 4703 Building (FFTF Control Building) HVAC Condensate, Miscellaneous Stream #15, Injection Well #1B | Rejected | RL-MS01 | | RL-ER03 |
| 400 FD2, 400 Area French Drain 2, 4621E Building HVAC Condensate and Stormwater, Miscellaneous Stream #16, Injection Well #02 | Rejected | RL-MS01 | | RL-ER03 |
| 400 FD3, 400 Area French Drain 3, 408A East Dump Heat Exchanger Stormwater, Miscellaneous Stream #17, Injection Well #03 | Rejected | RL-MS01 | | RL-ER03 |
| 400 FD4, 400 Area French Drain 4, 491E Heat Transport Building Stormwater and HVAC Condensate, Miscellaneous Stream #18 | Rejected | RL-MS01 | | RL-ER03 |
| 400 FD5, 400 Area French Drain 5, 408 South Building Stormwater and Condensate, Miscellaneous Stream #19, Injection Well #05 | Rejected | RL-MS01 | | RL-ER03 |
| 400 FD6, 400 Area French Drain 6, 408C West Dump Heat Exchanger Sump Stormwater, Miscellaneous Stream #20 | Rejected | RL-MS01 | | RL-ER03 |

## TABLE 4-80 Advanced Reactors Transition Project Facility Life-Cycle Responsibility Assignments for Waste Sites (Continued)

| Waste Site | Status | Life Cycle Phase | | |
|---|---|---|---|---|
| | | S&M | Post Ops | Remedial Action |
| 400 FD7, 400 Area French Drain 7, 4621W Auxiliary Equipment Building HVAC Condensate and Stormwater, Miscellaneous Stream #21, 453C Switch Gear Pad Stormwater, Miscellaneous Stream #27, Injection Well #07 | Rejected | RL-MS01 | | RL-ER03 |
| 400 FD8, 400 Area French Drain 8, 4621W Auxiliary Equipment Building HVAC Condensate, Miscellaneous Stream #22, Injection Well #08 | Rejected | RL-MS01 | | RL-ER03 |
| 400 FD9, 400 Area French Drain 9, 481 Pumphouse Sanitary Water and Salt Water, Miscellaneous Stream #23, Injection Well #09 | Rejected | RL-MS01 | | RL-ER03 |
| 400 PPSS, 400 Area Process Pond and Sewer System, 4904 Process Sewer System, 4904 Process Sewer Main, 4608 Percolation Pond, 4608B Control Structure and Process Sewer Sampling Site | Active | RL-MS01 | RL-ER03 | RL-ER03 |
| 400 RFD, 400 Area Retired French Drains | Rejected | RL-MS01 | | |
| 400 RSP, 400 Area Retired Sanitary Pond | Rejected | RL-MS01 | | RL-ER03 |
| 400 SBT, 400 Area Sand Bottom Trench, 400 Area Retired Sand Bottom Trench, Cooling Tower Overflow Trench | Rejected | RL-MS01 | | |
| 400-1, 400-1 Dump Site | Rejected | RL-MS01 | | RL-ER03 |
| 400-10, 400 FD11, 400 Area French Drain #11, 453B Switch Gear Pad Stormwater, Miscellaneous Stream #26, Injection Well #11 | Rejected | RL-MS01 | | |
| 400-13, Waste Dumping Site (East of FFTF) | Rejected | RL-MS01 | | RL-ER03 |
| 400-14, Burn Pit (East of FFTF) | Rejected | RL-MS01 | | RL-ER03 |
| 400-15, Diesel Fuel Tank Fitting Leak | Rejected(Proposed) | RL-MS01 | | |
| 400-16, 4831 Flammable Storage Facility, 4831 FSF | Rejected | RL-MS01 | | RL-ER03 |
| 400-17, Buried Construction Waste Area #1, Buried Construction Waste Area | Rejected | RL-MS01 | | RL-ER03 |
| 400-18, Buried Construction Waste Area #2, Buried Construction Waste Area | Rejected | RL-MS01 | | RL-ER03 |
| 400-19, Hazardous Waste Temporary Storage Facility, 400-30, 440 Building 90-Day Waste Accumulation Area | Rejected | RL-MS01 | | RL-ER03 |
| 400-2, Concrete Batch Plant | Rejected | RL-MS01 | | |
| 400-20, Altitude Valve Pit T-58, Miscellaneous Stream #31 | Rejected | RL-MS01 | | |
| 400-21, Altitude Valve Pit T-87, Miscellaneous Stream #32 | Rejected | RL-MS01 | | |
| 400-22, Altitude Valve Pit T-330 French Drain, Miscellaneous Stream #30 | Rejected | RL-MS01 | | |
| 400-23, Well Pump P-14 French Drain, Miscellaneous Stream #34, 480-A Pump House French Drain | Rejected | RL-MS01 | | RL-ER03 |
| 400-24, Well Pump P-15 French Drain, Miscellaneous Stream #35 | Rejected | RL-MS01 | | RL-ER03 |
| 400-25, Well Pump P-16 French Drain, Miscellaneous Stream #36 | Rejected | RL-MS01 | | RL-ER03 |
| 400-26, 451-A Substation and B/N Plant French Drain | Rejected | RL-MS01 | | |
| 400-28, FFTF Dichlorodifluoromethane Releases | Rejected | RL-MS01 | | |
| 400-29, FFTF PCB Containing Transformers | Rejected | RL-MS01 | | |
| 400-3, 400 DT, 400 Area Drainage Trench, 400 Area Storm Drain Outfall Trench, Miscellaneous Stream #732 | Rejected | RL-MS01 | | |
| 400-31, Sodium Storage Facility, 402 Building | Active | RL-MS01 | RL-ER03 | RL-ER03 |
| 400-32, U.G. Dry Well - North, Construction Dry Well | Rejected | RL-MS01 | | RL-ER03 |
| 400-33, U.G. Dry Well - South, Construction Dry Well | Rejected | RL-MS01 | | RL-ER03 |
| 400-34, Northwest Surface Water Drainage Ditch, Miscellaneous Stream #733 | Rejected | RL-MS01 | | |
| 400-35, Southwest Surface Water Drainage Ditch, Miscellaneous Stream #734 | Rejected | RL-MS01 | | |
| 400-4, Suspected Burial Ground (East of FFTF) | Rejected | RL-MS01 | | RL-ER03 |
| 400-5, Septic Tank or Cistern | Closed Out | RL-MS01 | | RL-ER03 |
| 400-6, Material Dumping Area (North of FFTF), Material Dumping Area and Building Foundation | Rejected | RL-MS01 | | RL-ER03 |
| 400-8, Construction Material Dumping Area (North of FFTF) | Rejected | RL-MS01 | | RL-ER03 |
| 400-9, 400 RPSSTP, 400 Area Retired Portable Sanitary Sewer Treatment Plant | Rejected | RL-MS01 | | RL-ER03 |
| 403 FD, Discharge point from the 403 Building, 403 French Drain, 400 Area French Drain Discharge from 403, 400 Area Drain Discharge from 403, Miscellaneous Stream #37 | Rejected | RL-MS01 | | RL-ER03 |
| 427 HWSA, 427 Building Fuel Cycle Plant Hazardous Waste Storage Area, 427 Building Fuels and Materials Exam. Facility HWSA | Closed Out | RL-MS01 | | RL-ER03 |
| 437 MASF, 400 Area Maintenance and Storage Facility, 437 Maintenance and Storage Facility | Active | RL-MS01 | RL-ER03 | RL-ER03 |
| 4713-B FD, 4713-B French Drain, Miscellaneous Stream #33 | Rejected | RL-MS01 | | RL-ER03 |
| 4713-B HWSA, 4713-B Hazardous Waste Storage Area | Rejected | RL-MS01 | | RL-ER03 |

**TABLE 4-80 Advanced Reactors Transition Project Facility Life-Cycle Responsibility Assignments for Waste Sites (Continued)**

| Waste Site | Status | Life Cycle Phase | | |
|---|---|---|---|---|
| | | S&M | Post Ops | Remedial Action |
| 4713-B LDFD, 4713-B Loading Dock French Drain, Miscellaneous Stream #469 | Rejected | RL-MS01 | | RL-ER03 |
| 4721 FD, 400 Area French Drain Discharge from 4721 building Misc. Stream#28 | Rejected | RL-MS01 | | RL-ER03 |
| 4831 LHWSA, 4831 Laydown HWSA, 4831 Laydown Hazardous Waste Storage Area, 4831 Flammable Storage Facility | Closed Out | RL-MS01 | | RL-ER03 |
| 4843, 4843 Building, 4843 Alkali Metal Storage Facility, 4843 AMSF, 4843 FFTF Sodium Storage, 4843 Laydown Area Warehouse | Closed Out | RL-MS01 | | |

The 'Rejected' and 'Completed' waste sites are part of the Project Hanford Management Contract (PHMC), but require no additional work from the PHMC team. When they are removed from the contract via direction from the RL Contracting Officer representative, they will be removed from this specification.

* RL PBS Identifier Index:

RL-ER02 - 200 Area Source Remedial Action
RL-ER03 - 300 Area Source Remedial Action
RL-ER05 - Surveillance & Maintenance
RL-ER07 - Long Term Surveillance & Maintenance
RL-MS01 - FFTF Project
RL-TP11 - Advanced Reactors Transition

## 4.5.e Performance Measures

Performance measures are used to monitor both mission and corporate management. In this document, our focus is on mission management. There are two types of mission-focused performance measures. First, there are performance measures that monitor the progress made on activities that must be completed to enable a key step in waste/material cleanup to occur. For the Advanced Reactor Transition mission, these activities may involve the upgrade and repair of facility systems, development of facility deactivation plans and regulatory documentation, and search for beneficial uses for facilities and equipment.

Second, there are performance measures that track the progress made in the processing of wastes, other materials, and facilities. These "process" measures monitor changes in waste/material/facility form, storage/containment method, and location. These measures are important because they are directly linked to two key Success Indicators - the reduction in the level of active management required for the inventory and the reduction in the hazard posed by the waste/material. Process measures will monitor the waste/material/facility during each major processing step as it transitions from its initial configuration to the configuration described by the appropriate endpoint target. Endpoint targets for the Advanced Reactor Transition mission are presented in the Hanford Strategic Plan and are included in the *Facility Life-Cycle Requirements Section* for each project that comprises this mission.

### 4.5.1 Advanced Reactors Transition

#### 4.5.1.1 Project Description Summary

The Advanced Reactors Transition (ART) PBS is made up of three projects: The Plutonium Recycle Test Reactor (PRTR)/309 Building, the Nuclear Energy (NE) Legacies, and prior to FY1999, the Fast Flux Test Facility (FFTF) and Fuels and Materials Examination Facility (FMEF). The purpose of the ART projects is to safely transition assigned facilities to a deactivated state. The FFTF and FMEF were placed in standby and assigned to DOE-NE.

The PRTR/309 Building, originally completed in 1960, provided an operating test reactor in the Hanford Works Plutonium Fuels Utilization Program to research and develop nuclear fuel technology. In 1962, the Plutonium Recycle Critical Facility (PRCF) was added to support the PRTR operation as a location where the reactivity values of fuel assemblies could be checked. Then in 1963, the Fuel Element Rupture Test Facility (FERTF) began operation in one fringe channel of the PRTR. The FERTF was used as a pilot irradiation facility to test new fuel element designs and new operating regimes. Reactor operations ceased in 1969. Several uses of the facility continued until August of 1993, when the PRTR/309 Building facility was declared excess by DOE. The transition of the building to the Environmental Restoration Contractor (ERC) will involve placing the facility in a configuration which reduces surveillance and maintenance costs to a minimum and meets acceptance criteria for turnover to the ERC.

The NE Legacies consist of non-nuclear facilities that were used in the development of the LMFBR programs and in related engineering studies. Some of the facilities contained sodium test loops that were used to study the properties of sodium heat transport systems and to investigate the behavior of mechanical components that would be operated in a sodium environment. Other facilities were used for sodium chemistry studies and for training the FFTF operators prior to the FFTF becoming operational.

The FFTF is a sodium cooled test reactor which operated from 1982 to 1992. It was in the process of transition to shutdown when it was placed in standby in January 1997. During FY 1997 and FY 1998, deactivation activities that would not impact a potential restart continued within the scope of this PBS.

### 4.5.1.2 Life-Cycle Material and Waste Flow

**Table 4-81 Advanced Reactors Transition Waste/Material Flow (Out)**

| Major Facility | Category | Period | Value | Units |
|---|---|---|---|---|
| 309 Facility | CH LLMW I | 2002 - 2002 | 1.28 | cubic meters |
| | CH LLW I | 2001 - 2002 | 25.7 | cubic meters |
| | Sanitary Solid Waste | 2000 - 2003 | 8.0 | cubic meters |
| NE Legacy Facilities | CH LLMW III | 2005 - 2005 | 0.257 | cubic meters |
| | Sanitary Solid Waste | 2000 - 2004 | 35.0 | cubic meters |

### 4.5.1.3 Facility Life-Cycle Requirements

- Requirements

  - Disposal of Alkali Metal Test Loops will comply with DOE/EA-0987
  - South 600 Area gaseous effluent releases shall be monitored.

- The Contractor shall safely and efficiently manage the deactivation of the 309 Building and associated facilities in the 300 Area whose mission was the space power program. The program will disposition nuclear material in these facilities. As the material is removed, each facility will be deactivated to reduce risk and attain the lowest surveillance and maintenance cost to a condition ready for disposition.
- The contractor shall clean-up the nuclear waste and stabilize the 309 Building and surrounding area such that the closure of the 309 Building can be accomplished.

- Planning Assumptions

  - High cost surplus facilities and systems shall be transitioned to a low cost, stable, deactivated condition.
  - Facilities and systems shall be made available for other uses.
  - Facilities shall be transitioned to the surveillance and maintenance phase when no longer required to support the site mission.
  - 300 Area facilities shall be surveilled and maintained within the approved safety envelope.

#### 4.5.1.4 Project Safety Authorization Basis/NEPA and Permits

The 309 facility and the NE Legacy facilities are all non-nuclear facilities and do not require a safety Authorization Basis. However, potential safety hazards to the public and worker have been evaluated and will be controlled during the deactivation process.

Evaluations related to the 309 Building are contained in WHC-SD-SP-PHA-001, PRTR/309 Building Nuclear Facility Preliminary Hazards Assessment (Cornwell 1994) and WHC-SD-NEL-HIE-001, 309 Building Fire Protection Analysis and Justification for Deactivation of Sprinkler System (Conner 1996). The 309 Building transition has also been subjected to a NEPA review and has been determined to be covered by a categorical exclusion (Farabee 1995).

The management and disposition of Nuclear Energy Legacy nonradioactive Na inventories and associated facilities shall be in accordance with WHC-SD-FF-MP-001, Hanford Site Sodium Management Plan (Guttenberg 1995) and DOE/EA-0987, Environmental Assessment: Disposition of Alkali Metal Test Loops, Hanford Site, Richland, Washington (DOE 1995l). Additional safety evaluations are documented in WHC-SD-PRP-HA-020, 300 Area Sodium Storage Facilities Hazards Assessment (Campbell 1996) and HNF-SD-NEL-ASA-002, Hazard Baseline Documentation and Auditable Safety Analysis of the 3718-M Sodium Transfer Operation in 337 Building Highbay (Brehm 1997).

#### 4.5.1.5 Tri-Party Agreement Requirements

Tri-Party Agreement Change Request M-92-98-01 places the M-92-9 and M-92-10 milestones "in abeyance".

- TPA.M.92.9 Complete acquisition of new facilities, modification of existing faciities, and/or modification of planned facilities necessary for the storage, treatment/processing, and disposal of Hanford Site Sodium (Na). [Due Date: TBD]
- TPA.M.92.10 TPA Milestone M-92-10, Submit Hanford Site sodium project management plan (PMP) to Ecology pursuant to agreement action plan section 11.5. [Due Date: October 1998]
- TPA.M.92.11.T.1 Complete disposition options for all Hanford non-radioactive sodium. [Due Date: 3/31/2002]

#### 4.5.1.6 Interfaces

**TABLE 4-82 Advanced Reactors Transition Interfaces**

| Project Title | Project Number | Interface |
|---|---|---|
| Hazardous Waste Disposal Contracts | EXTERNAL | Receives SODIUM TST, HAZ |
| Offsite Landfill | EXTERNAL | Receives 309 Building Sanitary Solid Waste |
| Hanford Legacy | EXTERNAL | Provides Legacy/SS 309 |
| Solid Waste Storage & Disposal | RL-WM03 | Receives PRTR, CH-LLMW-I<br>Receives PRTR, CH-LLW-I<br>Receives SODIUM TST, CH-LLMW-III |
| 300 Area Source Remedial Action | RL-ER03 | Receives Safe & Compliant Deactivated 309 Facility |
| Decontamination & Decommissioning | RL-ER06 | Receives Safe & Compliant Deactivated NE Legacy Facilities |

#### 4.5.1.7 Requirements References

- DOE/EA-0987, Disposition of Alkali Metal Test Loops, Hanford Site, Richland, Washington"
- DOE/EIS-0222D, Draft Hanford Remedial Action Environmental Impact Statement and Comprehensive Land Use Plan"
- DOE/RL-89-10, Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement), Revision 5"
- DOE/RL-96-92, Hanford Strategic Plan"

### 4.5.2 FFTF Project

#### 4.5.2.1 Project Description Summary

The FFTF and affiliated 400 Area buildings are to be maintained in a safe and compliant standby condition. The condition of the plant hardware, software and personnel is to be preserved in a manner not to preclude a plant restart. The facility will implement the secretarial decision on a future mission.

The Fast Flux Test Facility (FFTF) is the largest, most modern, liquid metal-cooled test reactor in the world. Originally constructed in the late 1970s, it's purpose was to support the U.S. Liquid Metal Fast Breeder Reactor (LMFBR) Program. The FFTF began power operation in 1982 and

demonstrated its ability to perform fuel and materials tests in support of both national and international fast breeder reactor programs, produce medical and industrial isotopes, perform materials tests for the fusion and space programs, perform passive safety tests, and provide customized neutron environments to meet customer needs. Detailed studies were also done to show the feasibility of producing significant quantities of Plutonium-238, as well as approximately 100 megawatts of electrical power with the addition of a steam powered turbine generator.

In January 1990, after a U. S. Department of Energy (DOE) evaluation of potential long term missions for the FFTF, DOE concluded that justification to support the expense of continued operation did not exist. This lead to a series of new studies and marketing efforts by the Governor of the State of Washington, in cooperation with the Congressional Delegation of the State. Eventually the Secretary of Energy informed the Washington State Congressional Delegation that DOE planned to commence a phased shutdown process on December 15, 1993, to place the FFTF in a radiologically and industrially safe shutdown condition. Accordingly, removal of the fuel from the reactor vessel began in March 1994 and was completed in April 1995. Following this major accomplishment, the washing of sodium wetted, fueled components was successfully demonstrated.

In order to remove the spent nuclear fuel from storage in the FFTF, procurement contracts were placed for the fabrication of Interim Storage Casks (ISC) and Core Component Containers (CCC) that will be used for the dry storage of washed, FFTF nuclear fueled components. The CCC, when filled with up to seven clean FFTF fueled components, is placed inside of an ISC and transported to the 400 Area Interim Storage Area (ISA), located in the northeast corner of the FFTF complex. The 400 Area ISA is large enough to also store spent nuclear fuel from other facilities in the Hanford 300 Area.

After preparations were made to support the early draining of the secondary loop sodium to in-plant storage tanks in November 1995, DOE ordered all drain activities delayed while an expedited review was conducted on the possible benefits of continued reactor operation for tritium production. Eventually, DOE suspended actions to drain the secondary loop sodium until further notice and deferred all activities that would affect the potential to restart the reactor. Then in January 1997, the Secretary of Energy, by Memorandum of Decision (MOD), directed the FFTF be maintained in a standby condition while studies are conducted to determine if the FFTF could perform a role in augmenting the tritium production options. The FFTF was determined to not be a candidate for tritium production, however evaluation of its possible use in production of medical and other isotopes has continued and the FFTF remains in standby pending the outcome of that effort. Despite these delays to the shutdown plan, significant progress has been made in several key areas which include: packaging and storing highly-radioactive, spent, fueled components in ISCs; procedure preparation for draining plant sodium; completing the reactor vessel plenum drill development project; and completing the construction of the Sodium Storage Facility (SSF). The new SSF is located adjacent to the FFTF and is capable of storing 292,000 gallons of radioactive sodium, which will accommodate all drainable sodium from the FFTF.

The FMEF was built during the late 1970s and early 1980s as a major addition to the breeder reactor technology development program. Its design was initiated in 1978 and underwent several major changes in scope as a result of changes in the direction of the DOE's breeder reactor development programs. The initial design concept was to provide a facility with capability to destructively and nondestructively inspect irradiated fuel materials from the DOE

Research and Development Breeder Reactor projects being developed at that time (the FFTF and the Clinch River Breeder Reactor Plant [CRBRP]). The first facility scope revision occurred in April 1979, when a second breeder reactor development facility was incorporated within the FMEF design. This facility, the High Performance Fuels Laboratory (HPFL), was to produce breeder reactor fuel assemblies for the FFTF and the CRBRP. It included fabrication of high-exposure and spiked fuels for proliferation resistance. During 1979, the U.S. Government's proliferation policy was changed and the need for a HPFL type of fuel fabrication was eliminated. As a result, the HPFL process was replaced by the Secure Automated Fabrication (SAF) Line in October 1980. Further changes in the DOE Breeder Reactor Program direction resulted in a facility scope reduction in October 1983, removing the irradiated fuel examination functions. During 1983, modifications to the shops and storage portion of the Entry Wing were incorporated for FFTF fuel assembly fabrication (pins to assemblies). The Fuel Assembly Area (FAA) was intended to support fuel pin inspection, assembly, and storage. Low-exposure, SAF-fabricated driver fuel pins would be transferred to the FAA for final processing. With the demise of the DOE Breeder Reactor Program, the SAF Project was canceled and the FAA was never activated. Several other projects have altered the original design of the facility, but none have ever come to fruition. The facility is closed, in standby, except for limited use of shop and storage space for activities in support of the Spent Nuclear Fuels Project and the River Protection Project.

#### 4.5.2.2 Life-Cycle Material and Waste Flow

**Table 4-83 FFTF Project Waste/Material Flow (Out)**

| Major Facility | Category | Period | Value | Units |
|---|---|---|---|---|
| FFTF | Asbestos | 2000 - 2005 | 28.0 | cubic meters |
| | CH LLW I | 2000 - 2005 | 67.6 | cubic meters |
| | CH LLW III | 2000 - 2005 | 1.54 | cubic meters |
| | HAZ | 2000 - 2005 | 5.99 | cubic meters |
| | Highly Enriched Uranium (HEU) | 2002 - 2002 | 42.7 | kilograms |
| | HLW | 2000 - 2018 | 156.0 | cubic meters |
| | Misc SNM | 2002 - 2002 | 32.0 | Items |
| | RH LLW III | 2001 - 2005 | 80.5 | cubic meters |
| | Sanitary Solid Waste | 2000 - 2005 | 22400 | cubic meters |
| | Spent Nuclear Fuel (SNF) | 2000 - 2003 | 11.9 | MTHM |
| | Waste Water | 2004 - 2004 | 30.2 | cubic meters |

#### 4.5.2.3 Facility Life-Cycle Requirements

- Requirements

  - South 600 Area gaseous effluent releases shall be monitored.
  - The Contractor shall manage the stabilization/disposition of nuclear material, fuel, and hazardous materials, and the deactivation of the FFTF and associated systems to a condition ready for final disposition, reducing the risk and attain the lowest surveillance and maintenance cost. The Contractor shall complete the sodium removal, wash the fuel elements, and place the cleaned elements in dry casks for storage. The Contractor shall complete the deactivation of FFTF.

- Planning Assumptions

- High cost surplus facilities and systems shall be transitioned to a low cost, stable, deactivated condition.
- Facilities and systems shall be made available for other uses.
- 400 Area surplus facilities shall be transitioned to the surveillance and maintenance phase.
- FFTF shall be transitioned to the surveillance and maintenance phase
- South 600 Area special nuclear materials shall be moved to the Central Plateau.
- 400 Area uranium shall be interim stored in the 400 Area.
- Nuclear materials shall be moved from the 400 Area to the Central Plateau.
- FFTF shall be maintained within the approved safety envelope.
- Spent fuels (light water reactor) shall be moved from the 400 Area interim storage to the Central Plateau Interim Storage.
- 400 Area Nuclear materials shall be stabilized.

#### 4.5.2.4 Project Safety Authorization Basis/NEPA and Permits

The Authorization Basis for FFTF is contained in WHC-TI-75002 (Vol. 1-10) (Gantt 1997) and WHC-SD-FF-SAR-007 (Gantt 1993). Deactivation activities shall be evaluated against the approved safety basis to identify any potential USQs. If the activity is covered by the analysis in the safety basis, no additional safety basis documentation or evaluation is required. If the activity is not covered, either the work plans must be modified to stay within the bounds of the existing safety basis or the safety basis must be modified through additional safety analyses. Once approved by RL, the new analysis shall become part of the approved safety basis.

Environmental, safety, and health requirements for FFTF are contained in WHC-SD-MP-SRID-006, Fast Flux Test Facility Standards Requirements Identification Document (Hisaw 1996). The potential environmental impacts of the FFTF deactivation have been reviewed and documented in DOE/EA-0993, Environmental Assessment: Shutdown of the Fast Flux Test Facility, Hanford Site, Richland, Washington (DOE 1995k).

#### 4.5.2.5 Tri-Party Agreement Requirements

Tri-Party Agreement Change Request M-81-98-01 places the M-81 series milestones "in abeyance" and M-20-29A milestone in "TBD" status.

- TPA.M.20.29.A Submit Sodium Storage Facility and Sodium Reaction Facility closure plan. [Due Date: 12/31/1999]
- TPA.M.81.0.T.2 Complete transfer of irraditated fuel to dry cask storage. [Due Date: 10/31/1998]
- TPA.M.81.0.T.3 Complete transfer of unirraditated fuel to the Plutonium Finishing Plant. [Due Date: 10/31/1998]
- TPA.M.81.0.T.4 Complete transfer of special fuel to the Idaho National Engineering Laboratory for consolidated storage. [Due Date: 10/31/1998]
- TPA.M.81.0.T.5 Complete auxiliary systems deactivation. [Due Date: 3/31/2001]
- TPA.M.81.2.T.1 Submit final sodium disposition evaluation report/decision point. [Due Date: 6/30/1998]
- TPA.M.81.3 Submit FFTF End-point criteria document. [Due Date: 12/31/1998]
- TPA.M.81.4 Complete FFTF Sodium drain. [Due Date: 3/31/2000]

- TPA.M.81.4.T.1 Complete Reactor and Heat Transport System Sodium drain. [Due Date: 4/30/1998]
- TPA.M.81.4.T.2 Complete Interim Decay and Storage Vessel and Fuel Storage Facility Sodium drain. [Due Date: 12/31/1998]
- TPA.M.81.5 Submit FFTF Surveillance and Maintenance Plan. [Due Date: 6/30/2001]
- TPA.M.81.6 Complete PCB transformer disposal. [Due Date:9/30/2001]
- TPA.M.92.9 Complete acquisition of new facilities, modification of existing faciities, and/or modification of planned facilities necessary for the storage, treatment/processing, and disposal of Hanford Site Sodium (Na). [Due Date: TBD]
- TPA.M.92.10 TPA Milestone M-92-10, Submit Hanford Site sodium project management plan (PMP) to Ecology pursuant to agreement action plan section 11.5. [Due Date: October 1998]
- TPA.MX.92.6.T.1 Complete commercial disposition and/or the acquisition of new facilities, modification of existing facilities, and/or modification of planned facilities necessary for storage, treatment/processing, and disposal/disposition of all Hanford Site UU. [Due Date: 12/31/2000] TPA Target Milestone MX-92-06T.
  This target date includes all UU located in 300 Area fuel supply facilities (Uranium dioxide powder and pellets stored in cans, pins, assemblies, and drums), Uranium trioxide (UO3) powder stored in T-hoppers adjacent to the U-Plant, depleted UO3 stored in 55 gallon drums in the 200 West Area and the 4713 Building.

### 4.5.2.6 Interfaces

**TABLE 4-84 FFTF Project Interfaces**

| Project Title | Project Number | Interface |
|---|---|---|
| Offsite Landfill | EXTERNAL | Receives FFTF Asbestos<br>Receives FFTF Sanitary Solid Waste |
| Idaho National Engineering Laboratory | EXTERNAL | Receives FFTF Highly Enriched Uranium |
| Hazardous Waste Disposal Contracts | EXTERNAL | Receives FFTF Hazardous Waste |
| Hanford Legacy | EXTERNAL | Provides Initial FFTF LLW (Liquid) |
| Tank Farm Operations | RL-TW03 | Receives FFTF decon wash water, HLW stream |
| Solid Waste Storage & Disposal | RL-WM03 | Receives FFTF, CH-LLW-I<br>Receives FFTF, CH-LLW-III<br>Receives FFTF, RH-LLW-III |
| Liquid Effluents | RL-WM05 | Receives FFTF decon waste water |
| Spent Nuclear Fuel Project | RL-WM01 | Receives FFTF Spent Nuclear Fuel (to 200ISA)<br>Receives FFTF Spent Nuclear Fuel (to INEEL) |
| Canister Storage Building Operations | RL-WM02 | Receives FFTF Spent Nuclear Fuel (to 200ISA) |
| PFP | RL-TP05 | Receives FFTF SNM<br>Receives FFTF Spent Nuclear Fuel (to PFP) |
| Decontamination & Decommissioning | RL-ER06 | Receives Safe & Compliant Deactivated Fast Flux Test Facility |

### 4.5.2.7 Requirements References

- DOE/EIS-0222D, Draft Hanford Remedial Action Environmental Impact Statement and Comprehensive Land Use Plan"
- DOE/RL-89-10, Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement), Revision 5"
- DOE/RL-96-92, Hanford Strategic Plan"